UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/719,423	11/21/2003	Eric R. Hansen	204560-73806	3387

7590 12/31/2007

BARMES & THORNBURG
11 South Meridian Street
Indianapolis, IN 46204

EXAMINER	
LU, JIPING	
ART UNIT	PAPER NUMBER
3749	

MAIL DATE	DELIVERY MODE
12/31/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/719,423
Filing Date: November 21, 2003
Appellant(s): HANSEN ET AL.

Shawn D. Bauer
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 10/1/2007 appealing from the Office action mailed 11/29/2006.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

No amendment after final has been filed.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct

WITHDRAWN REJECTIONS

The following grounds of rejection are not presented for review on appeal because they have been withdrawn by the examiner. Claims 19-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iken et al (U. S. Pat. 3,488,700) in view of Graat et al. (U. S. Pat. 4,255,115)

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

3,584,850	Brandvold	6-1971
3,488,700	IKEN ET AL.	1-1970
4,255,115	GRAAT ET AL.	3-1981
5,413,476	BAUKAL, JR. ET AL.	5-1995

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 26-29, 31-34 are rejected under 35 U.S.C. 102(b) as being anticipated by Branvold (U.S.Pat. 3,584,850).

Brandvold shows a mineral lime (CaO) processing inclined rotary kiln 12 with a lower combustion air end 14b and an upper material feed end 14a. An air inlet opening (at 24e) is located between two ends. An air nozzle 24e extends into the rotary vessel through the air inlet opening of the wall of vessel. A pressurized air source 24c is coupled to the air nozzle 24e. A preheater or precalcining assembly 20d, 20c,20 is positioned proximate to the upper end 14a. The preheating or precalcining assembly has a stationary vessel 20, 20c, 20d through which the mineral passes prior to advancement into the rotary vessel 12. The kiln existing hot flue gas stream passes in contact with the mineral subsequent to advancement out of the rotary vessel because portion of the hot kiln exhaust gas stream travels into the preheater/precalcining assembly 20d through the material outlet end of section 20d for preheating/precalcining the material inside the section 20d by direct contacting the kiln gas stream with the material inside the section 20d. A stationary hood 14k is positioned proximate to the combustion air inlet lower end 14b and a burner 16a is proximate to the combustion air inlet lower end 14b. For claim 31, a

mineral feed assembly 20, 20c, 20d is operable to heat lime mineral by contact with a kiln gas stream advancing therethrough and thereafter advance the lime mineral into the upper end 14a of the rotary vessel 12 because portion of the hot kiln exhaust gas stream travels into the preheater/precalcining assembly 20d through the material outlet end of assembly 20d for preheating/precalcining the material inside the assembly 20d by direct contacting the kiln gas stream with the material inside the assembly 20d.

5. Claims 1-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iken et al (U. S. Pat. 3,488,700) in view of Graat et al. (U. S. Pat. 4,255,115).

Iken shows a method of operating a mineral process kiln 1 having inclined rotary kiln. First combustion air 8 and fuel 4 is introduced at the lower end of the rotary kiln 1. The combustion will take place under stoichiometric or oxygen deficient conditions (see primary air supply 8 of Figs. 2 and 4 because complete combustion is taken at excessive or secondary air supply region 9). Additional or second enriched combustion air 7, 9 is introduced into the kiln 1 between the upper and lower ends of the kiln (through the kiln wall not numbered which supports material 3). However, Iken et al. do not **"expressly"** disclose a method of advancing a first quantity of combustion air to create sub-stoichiometric and advancing a second quantity of combustion air through an opening in a wall of the rotary vessel at a location between the lower end of the rotary vessel and an upper end of the rotary vessel to create super-stoichiometric conditions. Graat et al. teach a method of controlling the air/fuel stoichimetry including advancing a first quantity of combustion air 7 and fuel 6 at the end of the combustion chamber 1 and advancing a second quantity of combustion air (at 12) through an opening 11 in a wall of the chamber between two ends 2, 14' of the chamber 1. As shown in Fig. 5, combustion takes place

at area between 20 and burner with first combustion air 7 for incomplete combustion (i. e. sub-stoichiometric conditions) and at area 20 with second combustion air 12 supplied through port 20 for a complete combustion (i. e. super stoichiometric combustion) (see col. 6, lines 10-46). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the air/fuel stoichimetry controlling method of Iken et al to include the steps of advancing a first quantity of combustion air to create sub-stoichiometric conditions and advancing a second quantity of combustion air through an opening in a wall of the rotary vessel at a location between the lower end of the rotary vessel and an upper end of the rotary vessel to create super-stoichiometric conditions as taught by Graat et al in order to improve the combustion efficiency. With regard to claimed numerical ranges of the combustion air mass flow rate, it is deemed to be an obvious matter of design choice. Therefore, it would have been an obvious to one skill in the art to supply the combustion air at any desired mass flow rate in order to obtain the optimum result since applicant has not disclosed that the claimed combustion air mass flow rate range solves any stated problem in a new or unexpected way or is for any particular purpose which is unobvious to one of ordinary skill in the art.

6. Claims 1-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Branvold (U.S.Pat. 3,584,850) in view of Graat et al. (U. S. Pat. 4,255,115) or Baukal, Jr. et al. (U. S. Pat. 5,413,476).

Brandvold shows a mineral lime (CaO) processing inclined rotary kiln 12 with a lower combustion air end 14b and an upper material feed end 14a. An air inlet opening 24e is located between two ends. A preheater or precalcining assembly 20, 20d, 20c (incoming mineral passes inlet chute 20d and is directly preheated by portion of exiting hot flue gas traveled into the chute

20d through the outlet end of chute 20d) is positioned proximate to the upper end 18. The preheating or precalcining assembly has a stationary vessel 20, 20d, 20c through which the mineral passes prior to advancement into the rotary vessel. The kiln existing hot flue gas stream passes in contact with the mineral subsequent to advancement out of the rotary vessel. A stationary hood 14k is positioned proximate to the combustion air inlet lower end 14b and a burner 16a is proximate to the combustion air inlet lower end 14b. However, Brandvold does not expressly disclose a method of advancing a first quantity of combustion air to create sub-stoichiometric conditions and advancing a second quantity of combustion air to create super-stoichiometric conditions. Graat et al. teach a method of controlling the air/fuel stoichimetry including advancing a first quantity of combustion air 7 and fuel 6 at the end of the combustion chamber 1 and advancing a second quantity of combustion air (at 12) through an opening 11 in a wall of the chamber between two ends 2, 14' of the chamber 1. As shown in Fig. 5, combustion takes place at area between 20 and burner with first combustion air 7 for incomplete combustion (i. e. sub-stoichiometric conditions) and at area 20 with second combustion air 12 supplied through port 20 for a complete combustion (i. e. super stoichiometric combustion) (see col. 6, lines 10-46). Baukal illustrated the importance and the desire to have two stage combustions, e.g. sub-stoichiometric and supper-stoichiometric combustion in order to maximize the efficiency fuel efficiency and reduce pollutants. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the air/fuel stoichimetry controlling method of Brandvold to include the steps of advancing a first quantity of combustion air to create sub-stoichiometric conditions and advancing a second quantity of combustion air to create super-stoichiometric conditions as taught by Graat et al or Baukal in

order to improve the combustion efficiency. With regard to claimed numerical ranges of the combustion air mass flow rate, it is deemed to be an obvious matter of design choice. Therefore, it would have been an obvious to one skill in the art to supply the combustion air at any desired mass flow rate in order to obtain the optimum result since applicant has not disclosed that the claimed combustion air mass flow rate range solves any stated problem in a new or unexpected way or is for any particular purpose which is unobvious to one of ordinary skill in the art.

(10) Response to Argument

Before the examiner begins her rebuttals to the appellant's argument, it must be pointed out that the applicant has never positively defined what constitutes "sub-stoichiometric ratio" and "super-stoichiometric total air/fuel ratio" in the specification. Therefore, the examiner has interpreted the terms as indicated in the rejections above.

I. THE BOARD IS URGED TO AFFIRM THE FIRST GROUND OF REJECTION

The examiner will separately answer the appellant's arguments in the following groups:

Group A - claims 26-29

Group B - claims 31-34

A. Claims 26-29 are Anticipated by Brandvold

Broad claim 26 merely calls for a. an inclined rotary vessel with air inlet opening located between the upper and lower ends of the vessel; b. a stationary preheating/precalcining assembly positioned proximate to the upper end of the rotary vessel for charging or conveying minerals into the rotary vessel, so that the mineral passes prior to advancement into the rotary vessel and a kiln gas stream passes in contact with the mineral subsequent to the advancement out of the

rotary vessel; c. a stationary hood positioned proximate to the lower end of the rotary vessel and d. a burner positioned proximate to the lower end of the rotary vessel.

The appellant argues that a proper rejection under §102 has not been established in regard to claims 26-29 based on Brandvold because the Examiner is improperly picking and choosing between the two different types of kilns disclosed in Brandvold when formulating his rejection using the air inlet opening from Brandvold's long kiln and the preheating/precalcining assembly 38 of Brandvold's preheating/precalcing kiln. Examiner agrees that Figs. 1-4 and Fig. 5 are different embodiments and now focus only on Figs. 1-4 for the rejection under §102. The examiner disagrees with applicant's narrow interpretation of the prior art patent to Brandvold in view of the broad claims at issue.

It is the examiner's position that the Brandvold clearly shows the broadly claim features, namely; a. an inclined rotary vessel 12 with air inlet opening 24a-e located between the upper (at 14a) and lower (at 14b) ends of the vessel 12; b. a stationary preheating/precalcining assembly 20, 20c, 20d positioned proximate to the upper end (at 14a) of the rotary vessel 12 for charging or conveying minerals 10 into the rotary vessel 12, so that the mineral passes prior to advancement into the rotary vessel 12 and a kiln gas stream passes or seeps into 20d (through outlet end of 20d) in directly contact with the mineral 10 subsequent to the advancement out of the rotary vessel 12; c. a stationary hood 14k positioned proximate to the lower end 14b of the rotary vessel and d. a burner 16a positioned proximate to the lower end (at 14b) of the rotary vessel 12.

The appellant also argues that Brandvold's conventional long kiln includes an air inlet opening 24e positioned between the ends of the rotary kiln 12, but no preheating/precalcining

assembly. This is not true because there is no structural distinction defined in the broad claim 26 regarding the broadly claimed preheating/precalcing kiln in claim 26. Therefore, the examiner has interpreted the section 20d same as the broadly claimed preheater/precalciner assembly. Portion of the hot exhaust gas from the kiln will travel into the section 20d through the outlet end of 20d for direct contact with the material inside the section 20d and preheating/precalcining the material. It should be noted the broadly claimed preheating/precalciner assembly is nothing but a material preheating assembly to recover outgoing waste exhaust heat. This is a common practice and common sense in the rotary heating art for energy conservation.

The appellant also argues that the examiner has not been able to point to kiln within Brandvold that includes both an air inlet opening positioned between the ends of the rotary kiln and a preheating/precalciner assembly. However, Fig. 1 or Fig. 4 of Brandvold clearly shows an air inlet opening 24e positioned between the ends (at 14a, 14b) of the rotary kiln 12 and a preheating/precalciner assembly 20, 20c, 20d.

The appellant further argues that the examiner offered no legal basis in the rejection and refused to apply the proper legal standard when rejecting the claims. The appellant maintains that the examiner has picked and chosen from the two different types of kilns disclosed in Brandvold in the formation of his rejection. Again, this is not true. Fig. 5 of the Brandvold merely shows the outgoing hot waste exhaust gas stream in direct contact with the incoming cold mineral 10. This direct contact or heat exchange will also happen in Fig. 1. The claimed waste heat recovery is a common practice in the rotary kiln art.

Since the record clearly establishes that the broad claims are anticipated by the Brandvold patent under 35 USC 102, then, the rejection of independent claim 26 and claims 27-29

depending either directly or indirectly therefrom, should be affirmed.

B. Claims 31-34 are also anticipated by Brandvold

Broad claim 31 merely calls for a conventional lime kiln with a. inclined rotary vessel and air opening located between the upper and lower ends of the rotary vessel, b. a mineral feed assembly operably to heat lime mineral by contact with a kiln gas stream advancing there through and thereafter advance the lime into the upper end of the rotary vessel, c. a stationary hood positioned too the lower end of the rotary vessel and d. a burner positioned to the lower end of the rotary vessel.

Brandvold patent clearly shows this claimed conventional kiln 12, namely, a. inclined rotary vessel 12 and air opening 24a-e located between the upper (at 14a) and lower (14b) ends of the rotary vessel 12; b. a mineral feed assembly 20, 20c, 20d operably to heat lime mineral 10 by contact with a kiln gas stream (portion of kiln exhaust gas travels into 20d through the outlet end of 20d) advancing there through and thereafter advance the lime 10 into the upper end (at 14a) of the rotary vessel 12; c. a stationary hood 14k positioned to the lower end (at 14b) of the rotary vessel 12 and d. a burner 16 positioned to the lower end (at 14b) of the rotary vessel 12.

The appellant argues that the examiner has admitted that the mineral feed assembly 22a, 20d is operable to heat incoming lime mineral by existing hot exhaust gases thru heat conduction and radiation. The appellant concluded that Brandvold patent is different since "mineral passes through the inlet chute 20d and is indirectly heated by the exiting hot flue gas 28 in vessel 22a" through "heat conduction" and "radiation". In other words, the lime mineral is not in contact with the kiln gas stream. The appellant may draw this conclusion, but, the appellant fails to recognize the fact the Brabdvold does show a direct contact between the hot waste exhaust gas stream and

the incoming cold lime 10 inside chute or feed tube 20d since portion of the hot waste exhaust gas stream travels or flows into the chute or feed tube 20d through the material outlet end of 20d. This is where the direct heat exchange will meet the broadly claimed limitation regarding "a mineral feed assembly operably to heat lime mineral by contact with a kiln gas stream advancing there through and thereafter advance the lime into the upper end of the rotary vessel".

The appellant keeps arguing FIG. 5 of Brandvold does not include an air inlet between the ends of the rotary vessel. However, examiner now focuses only on Figs. 1-4 for the rejection under 35 USC 102. Each and every claimed element is shown by Figs. 1-4 of Brabdvold patent, then, the rejection of claims 31-34 should be affirmed.

II. THE BOARD IS URGED TO AFFIRM THE SECOND GROUND OF REJECTION

The examiner will separately answer the appellant's arguments in the following groups:

Group A - claims 1, 2, 4-9, and 11-14
Group B - claims 3 and 10
Group C - claim 15
Group D - claims 16-18
Group E - claims 19, 21 and 23-25
Group F - claim 20
Group G - claim 22

A. Claims 1, 2, 4-9, and 11-14 are Obvious over Iken and Graat

The appellant argues that § 103 rejection of claims 1, 2, 4-9, and 11-14 is improper and should be overruled. The appellant argues that there is no legally sufficient reason to combine the references. The appellant also argues that the examiner did not follow the guidelines set forth by the recent Supreme Court, KSR International Co. v. Teleflex, Inc. 82 USPQ 2d 1385 (2007). The examiner disagrees. Iken shows a method of operating a mineral process kiln 1 having inclined rotary kiln. First combustion air 8 and fuel 4 is introduced at the lower end of

the rotary kiln. Additional or second enriched combustion air 7, 9 is introduced into the kiln 1 between the upper and lower ends of the kiln (through the kiln wall not numbered which supports material 3). Graat et al. teach a method of controlling the air/fuel stoichimetry including advancing a first quantity of combustion air 7 and fuel 6 at the end of the combustion chamber 1 and advancing a second quantity of combustion air (at 12) through an opening 11 in a wall of the chamber between two ends 2, 14' of the chamber 1. As shown in Fig. 5, combustion takes place at area between 20 and burner with first combustion air 7 for incomplete combustion (i. e. sub-stoichiometric conditions) and at area 20 with second combustion air 12 supplied through port 20 for a complete combustion (i. e. super stoichiometric combustion) (see col. 6, lines 10-46). Therefore, it would have been obvious to one skilled in the art to modify the air/fuel stoichimetry controlling method of Iken et al to include the steps of advancing a first quantity of combustion air to create sub-stoichiometric conditions and advancing a second quantity of combustion air through an opening in a wall of the rotary vessel at a location between the lower end of the rotary vessel and an upper end of the rotary vessel to create super-stoichiometric conditions as taught by Graat et al in order to improve the combustion efficiency. In view of this combined teaching of the prior art references, one skilled in the art would have found it to be obvious to combine because the results would have been predictable (see KSR International Co. v. Teleflex, Inc. 82 USPQ 2d 1385 (2007).

In view of the broad claims presented, the examiner has provided sufficient analysis why a person of ordinary skilled in the art would combine Iken and Graat in order to improve the combustion efficiency. Again, it is a common practice and common sense to have complete combustion in order to improve efficiency and save fuel. That is the reason one skilled in the art

would love to save fuel and costs. The appellant simply can not dispute why one skilled in the art would not want to improve combustion efficiency (by controlling the air/fuel stoichimetry combustion) in order to save fuel costs. This is the very motive to combine the prior art references. Therefore, the rejection of claims l, 2, 4-9, and 11-14 should be affirmed.

Appellant further asserts that the prior art actually teaches away from the proposed combination of Iken and Graat. This is not true for the reasons and analysis as stated above. The appellant also argues that no one skilled in the art would modify the kiln of Iken to include the air supply of Graat since Graat introduces cold air directly into the flame. Iken requires that the secondary air be preheated by the mineral bed prior to introduction into the flame in order to produce its desired results. No one skilled in the art would introduce a cold air stream directly into the flame of lken's kiln to supplement the already present secondary air supply since the very purpose of lken's existing secondary air supply is to heat the air prior to it coming into contact with the flame. However, the broad claim 1 mention nothing about "cold air" or "preheated air". Therefore, this line of arguments is not germane to the broad claims at issue. Moreover, Patent to Graat et al. teaches that the hot gas generators can be fed not only with cold air, but may be used also in a direct process for the heating or drying (col. 6, lines 1-3).

The appellant argues that the proposed combination does not arrive at the invention. The appellant keeps arguing the deficiencies of each separate prior art reference but fails to recognize the combined teachings of the prior art references. The appellant must focus on the claims at issue. It is the examiner's position that it would have been obvious for one skilled in the art to modify the air/fuel stoichimetry controlling method of Iken et al to include the steps of advancing a first quantity of combustion air to create sub-stoichiometric conditions and

advancing a second quantity of combustion air through an opening in a wall of a vessel at a location between two ends of the vessel to create super-stoichiometric conditions as taught by Graat et al in order to improve the combustion efficiency. In view of this combined teaching of the prior art references, one skilled in the art would have found it to be obvious to combine because the results would have been predictable (see KSR International Co. v. Teleflex, Inc. 82 USPQ 2d 1385 (2007). Therefore, the combination of Iken and Graat does meet the broadly claimed invention of claims 1, 2, 4-9, and 11-14 and supports a rejection under §103. As such, the rejection of claims 1, 4-8, and 11-14 should be affirmed.

B. Claims 3 and 10 are obvious over Iken and Graat

A proper rejection under § 103 has been established in regard to claims 3 and 10 since the appellant fails to show any criticality of any claimed numerical ranges. The appellant fails to disclose that the claimed combustion air mass flow rate range solves any stated problem in a new or unexpected way or is for any particular purpose which is unobvious to on of ordinary skill in the art. Again, it is common practice and common sense in combustion art that to eliminate NOx, a complete combustion and/or excess air combustion is required. Therefore, any mass flow rate in excess of the rate of mass combustion consumption of combustion air in the kiln will reduce or eliminate NOx. Therefore, the examiner has concluded the claimed numerical ranges are deemed to be obvious matter of design choice in absence of showing any criticality over the prior art references. Because the appellant has not shown any criticality of the numerical ranges relating to claims 3 and 10, the Board is urged to affirm the rejection.

C. Claim 15 is obvious over Iken and Graat

A proper rejection under § 103 has been established in regard to claim 15 since claim 15 is dependent on claim 14 and, as stated above, a proper rejection of claim 14 has been established. Moreover, a proper rejection has been established in regard to claim 15 for similar reasons to as above in regard to claims 3 and 10. Namely, the examiner has established on the record why the claimed ranges are matters of design choice in absence of showing any criticality and such claimed excessive air combustion is common in the art to eliminate or reduce NOx. As such, the rejection of claim 15 should be affirmed.

D. Claims 16-18 are obvious over Iken and Gratt

A proper rejection under § 103 has been established in regard to claims 16-18 since claims 16-18 are dependent on claim 14 and, as stated above, a proper rejection of claim 14 has been established. Moreover, a proper rejection has also been established in regard to claims 16-18 since the Examiner has shown Iken discloses an air nozzle extending into the rotary vessel through an opening in the wall of the rotary vessel with a nozzle and Graat patent also shows combustion at super-stoichiometric conditions in the mid-portion of the rotary vessel. As such, the rejection of claims 16-18 should be affirmed.

E. Rejection of Claims 19, 21, and 23-25 over Iken and Graat

The arguments with respect to claims 19, 21, 23-25 are moot in view of the examiner's withdrawal of above rejection.

F. Rejection of Claim 20 over Iken and Graat

The arguments with respect to claim 20 are moot in view of the examiner's withdrawal of above rejection.

G. Rejection of Claim 22 over Iken and Graat

The arguments with respect to claim 22 are moot in view of the examiner's withdrawal of above rejection.

III. THE BOARD IS URGED TO AFFIRM THE THIRD GROUND OF REJECTION

The examiner will separately answer the appellant's arguments in the following groups:

Group A - claims 1, 2, 4-9, and 11-14
Group B - claims 3 and 10
Group C - claim 15
Group D - claims 16-18
Group E - claims 19, 21, and 23-25
Group F - claim 20
Group G - claim 22

A. Claims 1, 2, 4-9 and 11-14 are obvious over Brandvold and Graat

The § 103 rejection of claims 1, 2, 4-9, and 11-14 is proper and should be affirmed.

The appellant argues that there is no legally sufficient reason to combine the references. The examiner disagrees. The rejection as stated above in regard to the § 103 rejections based on Brandvold and Graat are fully incorporated into this section. It is the examiner's position that it would have been obvious to one skilled in the art to modify the mineral processing kiln operating method of Brandvold to include the steps of advancing a first quantity of combustion air to create sub-stoichiometric conditions and advancing a second quantity of combustion air through an opening in a wall of the rotary vessel at a location between the lower end of the rotary vessel and an upper end of the rotary vessel to create super-stoichiometric conditions as taught by Graat et al in order to improve the combustion efficiency and save fuel cost. In view of the broad claims presented, the examiner has provided sufficient analysis why a person of ordinary skilled in the art would combine. Brandvold and Graat in order to improve the combustion efficiency. Again, it is a common practice and common sense to have complete combustion in order to improve

efficiency and save fuel. That is the reason one skilled in the art would love to save fuel and costs. The appellant simply can not dispute why one skilled in the art would not want to improve combustion efficiency (by controlling the air/fuel stoichimetry combustion) in order to save fuel costs. This is the very motive to combine the prior art references. Therefore, the rejection of claims l, 2, 4-9, and 11-14 should be affirmed.

Appellants further argues that the prior art actually teaches away from the proposed combination of Brandvold and Graat. No one skilled in the art would combine Graat and Brandvold because the combustion system of Graat will not function in the kiln of Brandvold as asserted by the Examiner. The cold combustion air of Graat must be introduced directly into the flame and NOT at some other farther locations. Again the broad claims at issue fail to define any distance. Therefore, this line of arguments is not germane to the broad claims at issue. The combination does arrive at the broadly claimed invention. Furthermore, the applicant's own device also shows the secondary air 38 located at a far distance from the burner 24 identical to the prior art Brandvol patent's secondary air 14a-e and burner 16.

Brandvold patent shows a mineral lime (CaO) processing inclined rotary kiln 12 with a lower combustion air end 14b and an upper material feed end 14a. An air inlet opening 24e is located between two ends. A preheater or precalcining assembly 20, 20c, 20d (incoming mineral passes inlet chute 20d and is directly preheated by the exhaust hot flue gas) is positioned proximate to the upper end 14a. The preheating or precalcining assembly has a stationary vessel 20, 20c, 20d through which the mineral passes prior to advancement into the rotary vessel. The kiln existing hot flue gas stream passes in contact with the mineral subsequent to advancement out of the rotary vessel. A stationary hood 14k is positioned proximate to the combustion air

inlet lower end 14b and a burner 16a is proximate to the combustion air inlet lower end 14b. Graat et al. teach a method of controlling the air/fuel stoichimetry including advancing a first quantity of combustion air 7 and fuel 6 at the end of the combustion chamber 1 and advancing a second quantity of combustion air (at 12) through an opening 11 in a wall of the chamber between two ends 2, 14' of the chamber 1. As shown in Fig. 5, combustion takes place with first combustion air 7 (between 20 and burner) for incomplete combustion (i. e. sub-stoichiometric conditions) and with second combustion air 12 supplied through port 20 for a complete combustion (i. e. super stoichiometric combustion) (see col. 6, lines 10-46). Therefore, it would have been obvious to one skilled in the art to modify mineral processing kiln operating method of Brandvold to include the steps of advancing a first quantity of combustion air to create sub-stoichiometric conditions and advancing a second quantity of combustion air to create super-stoichiometric conditions as taught by Graat et al in order to improve the combustion efficiency and save fuel cost. In view of this combined teaching of the prior art references, one skilled in the art would have found it to be obvious to combine because the results would have been predictable (see KSR International Co. v. Teleflex, Inc. 82 USPQ 2d 1385 (2007). Based on the above, the examiner has established a proper § 103 rejection with regard to broad claims 1, 2, 4-9, and 11-14. As such, the rejection of claims 1, 2, 4-9, and 11-14 should be affirmed.

B. Claims 3 and 10 are obvious over Brandvold and Graat

A proper rejection under § 103 has been established in regard to claims 3 and 10 for similar reasons to as stated above in regard to the §103 rejections of claims 3 and 10 based on Brandvold and Graat, the entirety of such rebuttals being incorporated into this section. Namely, the examiner has established on the record why the claimed ranges are matters of design choice

and the appellant fails to establish any criticality of such claimed numerical ranges As such, the rejection of claims 3 and 10 should be affirmed.

C. Claim 15 is obvious over Brandvold and Graat

A proper rejection under §103 has been established in regard to claim 15 since claim 15 is dependent on claim 14 and, as discussed above, a proper rejection of claim 14 has been established. Moreover, a proper rejection has been established in regard to claim 15 for similar reasons to as stated above in regard to claims 3 and 10. Namely, the examiner has established on the record why the claimed ranges are matters of design choice and the appellant fails to establish any criticality over the prior art references. As such, the rejection of claim 15 should be affirmed.

D. Claims 16-18 are obvious over Brandvold and Gratt

A proper rejection under § 103 has been established in regard to claims 16-18 since claims 16-18 are dependent on claim 14 and, as discussed above, a proper rejection of claim 14 has been established. Moreover, a proper rejection has been established in regard to claims 16-18 since the Examiner has shown where Brandvold discloses an air nozzle extending into the rotary vessel through an opening in the wall of the rotary vessel with such a nozzle. The Graat patent uses combustion at super-stoichiometric conditions in the mid-portion of the rotary vessel. As such, the rejection of claims 16-18 should be affirmed.

E. Claim 19, 21, & 23-25 are obvious over Brandvold and Graat

The §103 rejection of claims 19, 21, and 23-25 is proper and should be affirmed. The appellant argues that there is no legally sufficient reason to combine the references. The examiner disagrees for the reasons as stated above and hereby incorporated in their entirety into

the examiner's rebuttal argument relating to claims 19, 21, and 23-25. Based on the above, the examiner has established a proper § 103 rejection with regard to broad claims 19, 21, and 23-25. As such, the rejection of claims 19, 21 and 23-25 should be affirmed.

F. Claim 20 is obvious over Brandvold and Graat

A proper rejection under § 103 has been established in regard to claim 20 since claim 20 is dependent on claim 19 and, as discussed herein, a proper rejection of claim 19 has been established. The arguments set forth above relating to the fact that the combination of Iken and Graat does arrive at the broadly claimed invention. As such, the rejection of claim 20 should be affirmed.

G. Claim 22 is not Obvious over Brandvold and Graat

A proper rejection under § 103 has been established in regard to claim 22 since claim 22 is dependent on claim 19 and, as discussed above, a proper rejection of claim 19 has been established. Moreover, a proper rejection has been established in regard to claim 22 for similar reasons to as stated above in regard to claims 3 and 10. Namely, the examiner has established on the record why the claimed ranges are matters of design choice and the applicant failed to establish any criticality over the prior art references. As such, the rejection of claim 22 should be affirmed.

IV. THE BOARD IS URGED TO REVERSE THE FOURTH GROUND OF REJECTION

The examiner will separately answer the appellant's arguments in the following groups.

Group A - claims 1, 2, 4-9 and 11-14
Group B - claims 3 and 10
Group C - claim 15
Group D - claims 16-18
Group E - claims 19, 21 and 23-25

Group F - claim 20
Group G - claim 22

A. Claims 1, 2, 4-9, and 11-14 are obvious over Brandvold and Baukal

The § 103 rejection of claims 1, 2, 4-9, and 11-14 is proper and should be affirmed. There is legally sufficient reason to combine the references. The § 103 rejection of claims 1, 2, 4-9 and 11-14 is proper and should be affirmed. The appellant argues that there is no legally sufficient reason to combine the references. The examiner disagrees. The rejection as stated above in regard to the § 103 rejections based on Brandvold and Baukal are fully incorporated into this section. It is the examiner's position that it would have been obvious to one skilled in the art to modify the mineral processing kiln operating method of Brandvold to include the steps of advancing a first quantity of combustion air to create sub-stoichiometric conditions and advancing a second quantity of combustion air to create super-stoichiometric (complete combustion) conditions as taught by Baukal et al in order to improve the combustion efficiency and save fuel cost. In view of the broad claims presented, the examiner has provided sufficient analysis why a person of ordinary skilled in the art would combine Brandvold and Baukal in order to improve the combustion efficiency. Again, it is a common practice and common sense to have complete combustion in order to improve efficiency and save fuel. That is the reason one skilled in the art would love to save fuel and costs. The appellant simply can not dispute why one skilled in the art would not want to improve combustion efficiency (by controlling the air/fuel stoichimetry combustion) in order to save fuel costs. This is the very motive to combine the prior art references. Therefore, the rejection of claims l, 2, 4-9, and 11-14 should be affirmed.

Appellants further argues that the prior art actually teaches away from the proposed combination of Brandvold and Baukal. No one skilled in the art would combine Brandvold and Baukal because the combustion system of Baukal will not function in the kiln of Brandvold as asserted by the examiner. The cold combustion air of Baukal must be introduced directly into the flame and NOT at some other farther locations. Again the broad claims at issue fail to define any distance. Therefore, this line of arguments is not germane to the broad claims at issue.

The appellant argues that the combination does not arrive at the invention. The examiner disagrees. Therefore, it would have been obvious to one skilled in the art to modify the air/fuel stoichimetric controlling method of Brandvold to include the steps of advancing a first quantity of combustion air to create sub-stoichiometric conditions and advancing a second quantity of combustion air to create super-stoichiometric conditions as taught by Baukal et al in order to improve the combustion efficiency and save fuel cost. In view of this combined teaching of the prior art references, one skilled in the art would have found it to be obvious to combine because the results would have been predictable (see KSR International Co. v. Teleflex, Inc. 82 USPQ 2d 1385 (2007). Based on the above, the examiner has established a proper § 103 rejection with regard to broad claims 1, 2, 4-9, and 11-14. As such, the rejection of claims 1, 2, 4-9, and 11-14 should be affirmed.

B. Claims 3 and 10 are obvious over Brandvold and Baukel

A proper rejection under § 103 has been established in regard to claims 3 and 10 for similar reasons to as stated above in regard to the §103 rejections of claims 3 and 10 based on Brandvold and Baukal, the entirety of such rebuttals being incorporated into this section. Namely, the examiner has established on the record why the claimed ranges are matters of design

choice and the appellant fails to establish any criticality of such claimed numerical ranges As such, the rejection of claims 3 and 10 should be affirmed.

C. Claim 15 is obvious over Brandvold and Baukel

A proper rejection under §103 has been established in regard to claim 15 since claim 15 is dependent on claim 14 and, as discussed above, a proper rejection of claim 14 has been established. Moreover, a proper rejection has been established in regard to claim 15 for similar reasons to as stated above in regard to claims 3 and 10. Namely, the examiner has established on the record why the claimed ranges are matters of design choice and the appellant fails to establish any criticality over the prior art references. As such, the rejection of claim 15 should be affirmed.

D. Claims 16-18 are obvious over Brandvold and Baukel

A proper rejection under § 103 has been established in regard to claims 16-18 since claims 16-18 are dependent on claim 14 and, as discussed above, a proper rejection of claim 14 has been established. Moreover, a proper rejection has been established in regard to claims 16-18 since the Examiner has shown where Brandvold discloses an air nozzle extending into the rotary vessel through an opening in the wall of the rotary vessel with such a nozzle. The Baukal patent uses combustion at super-stoichiometric conditions in the mid-portion of the rotary vessel. As such, the rejection of claims 16-18 should be affirmed.

E. Claim 19, 21, & 23-25 are obvious over Brandvold and Baukel

The §103 rejection of claims 19, 21, and 23-25 is proper and should be affirmed. The appellant argues that there is no legally sufficient reason to combine the references. The examiner disagrees for the reasons as stated above and hereby incorporated in their entirety into

the examiner's rebuttal argument relating to claims 19, 21, and 23-25. Based on the above, the examiner has established a proper § 103 rejection with regard to broad claims 19, 21, and 23-25. As such, the rejection of claims 19, 21 and 23-25 should be affirmed.

F. Claim 20 is obvious over Brandvold and Baukel

A proper rejection under § 103 has been established in regard to claim 20 since claim 20 is dependent on claim 19 and, as discussed herein, a proper rejection of claim 19 has been established. The arguments set forth above relating to the fact that the combination of Brandvold and Baukal does arrive at the broadly claimed invention. As such, the rejection of claim 20 should be affirmed.

G. Claim 22 is obvious over Brandvold and Baukel

A proper rejection under § 103 has been established in regard to claim 22 since claim 22 is dependent on claim 19 and, as discussed above, a proper rejection of claim 19 has been established. Moreover, a proper rejection has been established in regard to claim 22 for similar reasons to as stated above in regard to claims 3 and 10. Namely, the examiner has established on the record why the claimed ranges are matters of design choice and the applicant failed to establish any criticality over the prior art references. As such, the rejection of claim 22 should be affirmed.

SUMMARY CONCLUSIONS

Therefore, in view of the arguments presented above, it is submitted that each of the four grounds of rejection is correct. The Board is thus urged to affirm these rejections. Such action is respectfully requested.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Jiping Lu
Primary Examiner
Art Unit 3749

Conferees:

Steve McAllister

Marc Jimenez

Shawn D. Bauer
BARNES & THORNBURG LLP
11 South Meridian Street
Indianapolis, IN 46204